

**Flora and Fauna Survey
of the
Northern Territory University
Casuarina Campus**

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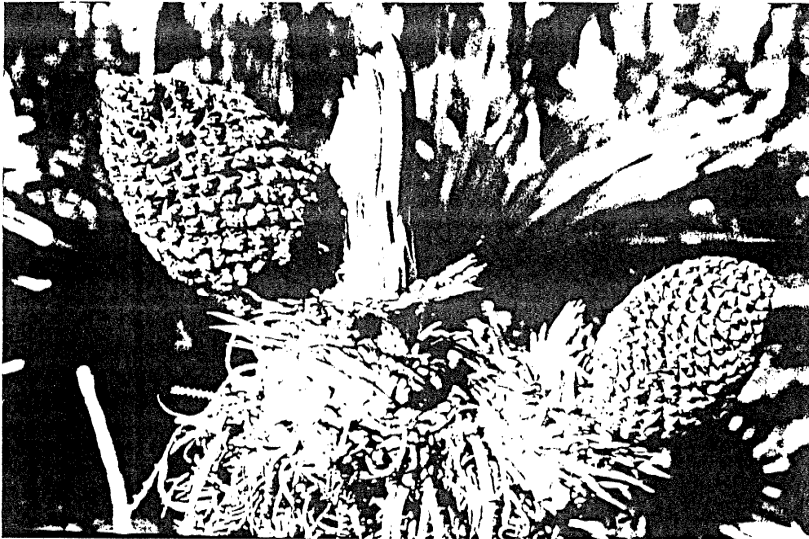


PLATE 1. Cycads, like this *Cycas armstrongi*, represent an ancient group related to conifers. Sharon Chirgwin (Science Faculty) is studying the growth rate and reproductive phenology of this species in bush remnants on the campus.

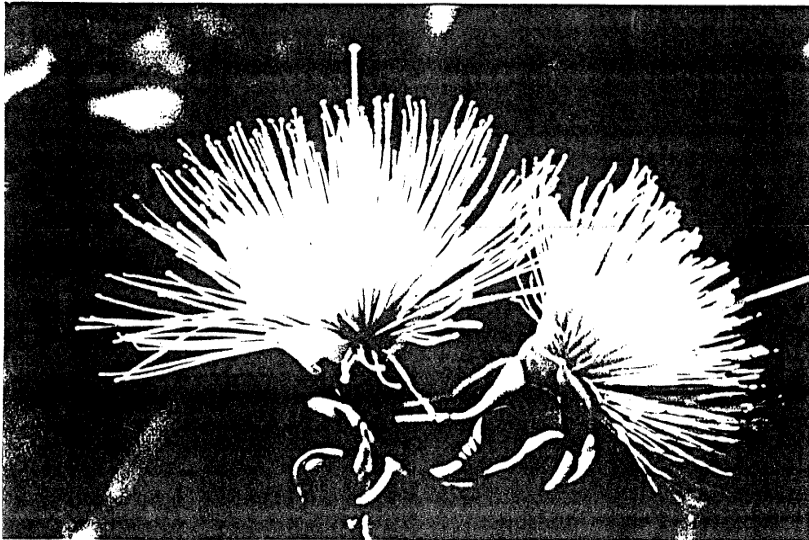


PLATE 2. The Cocky Apple *Planchonia careya* produces its short-lived, showy white flowers in the late Dry Season. The flowering biology of this reputedly bat-pollinated species is being investigated by R. Noske (Science Faculty) and G. Palmer (ex-CAIS).



PLATE 3. Coastal monsoon vine forests or jungles, like this one on Groote Eylandt, are special habitats with distinctive flora and fauna. Sixty percent (60%) of vine forests in the Darwin area have disappeared over the last 45 years.

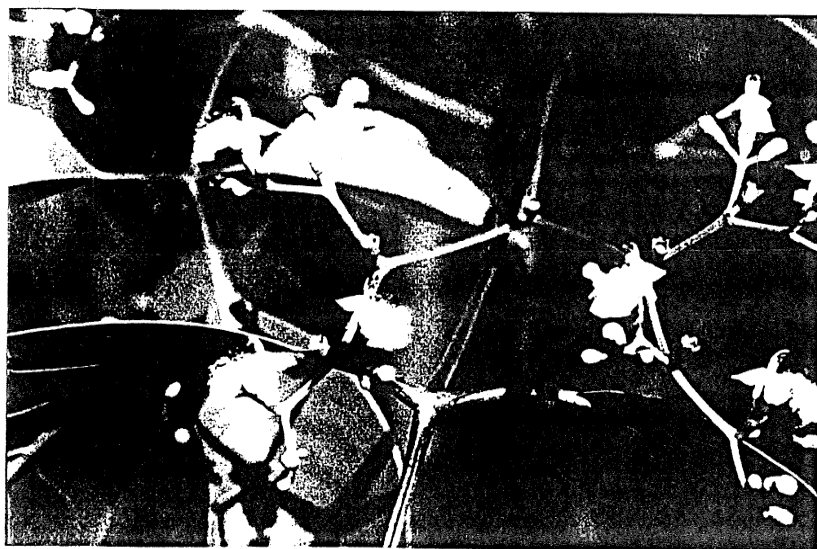


PLATE 4. Black Plum *Vitex glabrata* is a typical species of monsoon vine forests, but also occurs in open forests. Its grape-like fruits may be eaten raw, and are highly regarded by Aboriginal people.



PLATE 5. The White Apple *Syzygium eucalyptoides* in this photograph is one of several significantly large individuals of this species in the north-west corner of the site.



PLATE 6. *Pogonolobus reticulatus* is generally rare in the Darwin area, but abundant on the study site (especially Transect 2). The bark of the roots of this straggly shrub are crushed and boiled by Aboriginal people to produce a yellow dye, used for dilly-bags.

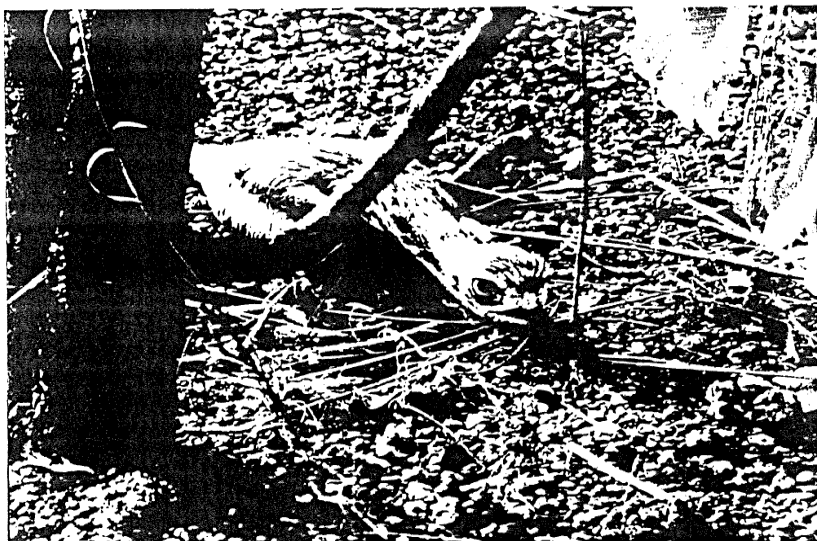


PLATE 7. The Bush Thick-knee is a large, ground-dwelling, nocturnal bird of the tropics. The campus has a resident breeding pair, one member of which is shown here, protecting its eggs by crouching low, using its cryptic coloration to avoid detection by potential predators.

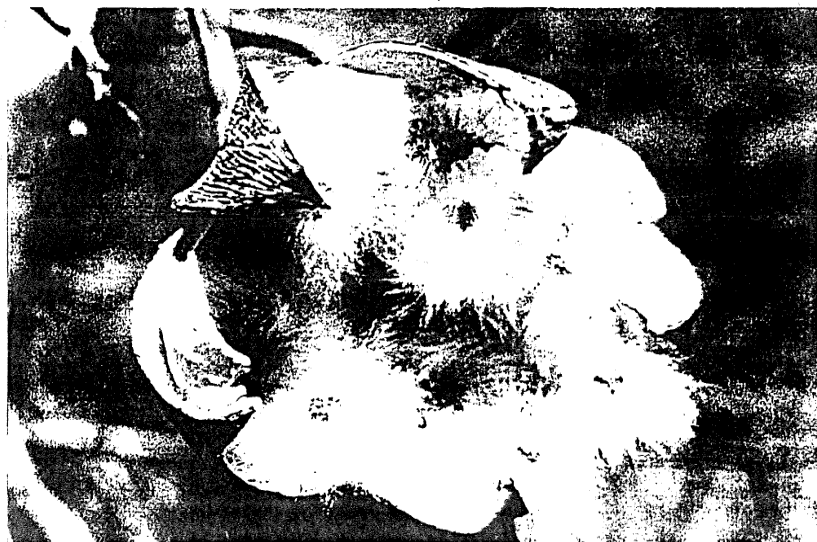


PLATE 8. The deciduous Kapok Bush *Cochlospermum fraseri* is widespread in woodland remnants on campus. The "cotton-wool" surrounding the seeds was used by Aboriginal people for body decoration.

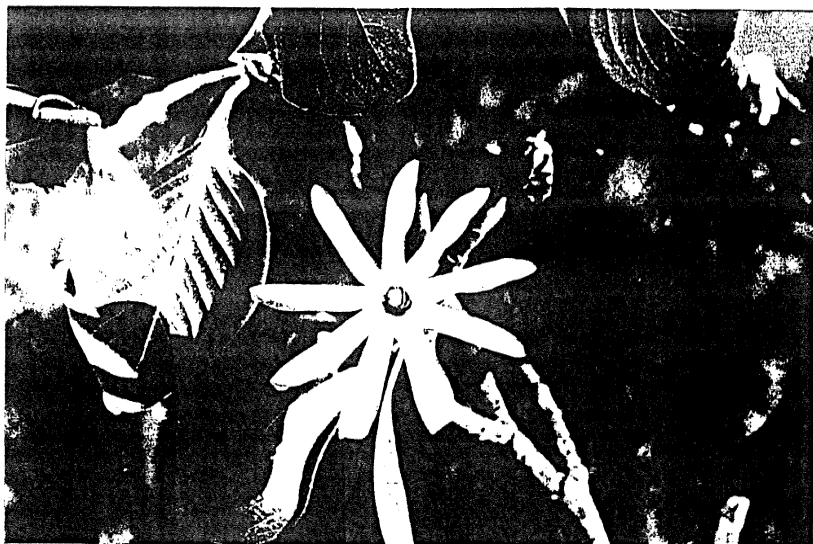


PLATE 9 (above)

The large, scented flowers of *Gardenia megasperma* are to be seen dotting the site in the late Dry season. The large green fruits are edible.

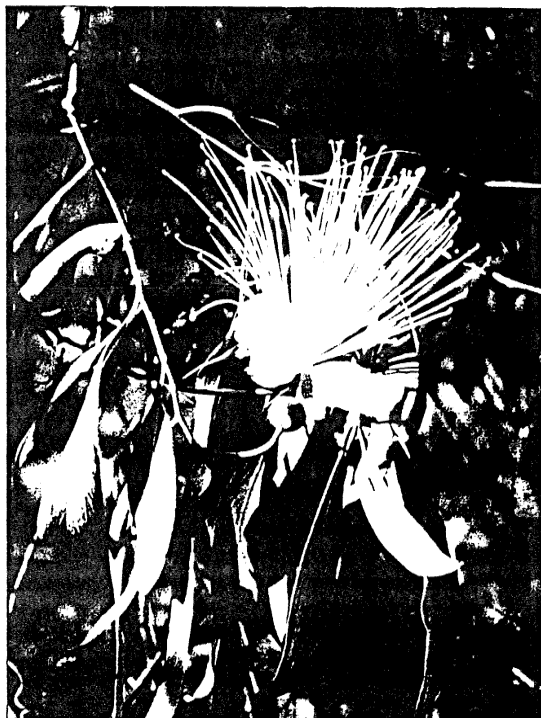


PLATE 10 (right)

Bush Orange *Capparis umbonata* has an edible fruit, which is sweet when ripe; but it is also an important Aboriginal medicine, infusions from the bark being used to treat open sores, as well as sore throats and stomach pain. It occurs in woodland remnants throughout the campus.

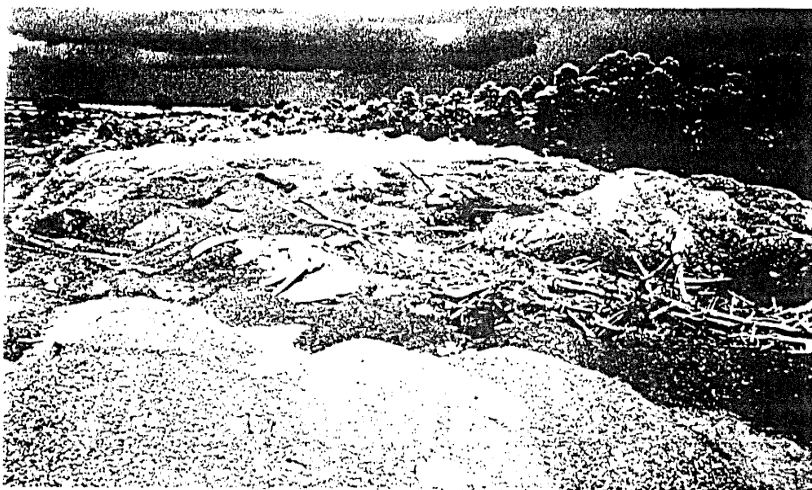


PLATE 11 (above)
Irresponsible soil dumping has resulted in encroachment of the remnant bushland in the East portion of the site (December 1992).

PLATE 12 (right)
Mission Grass *Pennisetum polystachion* (originally imported from Asia) is a fire-promoting weed that has spread over much of the campus. It presents a major problem for management of the remnants.



Flora and Fauna Survey of NTU Casuarina Campus

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COVER. The Red-flowered Kurrajong *Brachychiton megaphyllus* typifies the natural environment of the Top End, and is the floral emblem of Darwin. Endemic to the monsoon tropical woodlands of north-western Australia, it is a deciduous species, flowering just before the new leaves appear. Aboriginal people eat the roasted seeds (which taste like popcorn) after the dangerous irritant hairs covering the seeds and pods have been removed.

Flora and Fauna Survey of NTU Casuarina Campus

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1. BACKGROUND

The Casuarina Campus of the Northern Territory University (NTU) is currently undergoing extensive building and infrastructure development in accordance with its Master Plan. This Plan, designed by Woodhead Australia and Daryl Jackson Pty Ltd. Architects in Association, was first published in February 1990 and subsequently amended in 1991. In March 1992 the Plan was complemented by the Landscape Masterplan, produced by Clouston Australia & Jane Coleman (1992). A fundamental goal of the Landscape Masterplan was to create a landscape at the University, which "enhances and interprets the conservation values of the area, especially the mangroves" (p. 16), and to ensure that "new activities are compatible with natural and cultural conservation values of the area" (p. 47). The concept for the landscape plan was to "reflect the vegetation diversity and the extremes of the dry tropics" (p.21). The consultants identified several habitats in the undeveloped areas of the campus: "remnants of coastal woodland, estuarine mangroves, fringing monsoon vine forest and coastal dune grassland", which were considered to "represent a typical cross-section of coastal vegetation" (p. 4). They also state that "no rare or endangered species have been recorded in the area", though no sources of evidence or data are cited to verify this claim.

Recognition of the high conservation value of the mangroves is a recurring theme in the Plan (see pp 4-5, 17, 18, 20, 48). Yet scant attention is paid to the other plant communities (or habitats) mentioned above. Reasons are not explicitly given for considering the mangroves as a special environment, especially since they, like the woodland remnants, are in a state of regeneration after severe disturbance (although the rate of recovery has been more rapid in the mangroves due to the absence of fire). Instead, the consultants referred to the large area of regenerating woodland covering the northern and western areas of the campus as "disturbed or poorly managed vegetation of *marginal interest*" (p. 5, italics mine). This evaluation of the woodland is interesting for two reasons. Firstly, it was not based on any proper environmental investigation; indeed, there had been no systematic survey of the flora and fauna of the NTU Casuarina campus. Secondly, the statement strongly suggests that potentially "interested" groups, such as NTU Science, Horticulture and CAIS staff, were consulted. Sadly this was not the case. The repercussions of this oversight were evident at the public presentation of the Masterplan in April 1992, when several staff members expressed concern or disapproval over the lack of consideration given to the value of the woodland on the campus.

The aim of the present survey, commissioned by the Vice-Chancellor of the University, was to redress this oversight so that the environmental assets of the campus could be properly evaluated. The natural environment of the campus has been dramatically altered by clearing and fire in the past, yet remnant pockets of native plants have regenerated to the extent that they have been used as a teaching and research resource by lecturers in both Higher Education (Science) and ITAFE (Horticulture) for many years. In addition, these remnants provide a habitat corridor for a variety of animals. As the development of the campus has already impacted on these remnants, it seems sensible to take stock of the natural assets of the campus, so that areas of significance can be managed sensitively and appropriately.

2. OBJECTIVES

The objectives of this proposal were to:

- (1) identify the natural resources of the undeveloped side of the campus;
- (2) evaluate their significance from both conservation and educational perspectives; and

- (3) make recommendations regarding the management of significant resources in the light of the Master Plan.

3. LOCATION AND DESCRIPTION OF STUDY SITE

As much of the eastern half of the campus has already been developed, the present survey was restricted to the western half (hereafter called the study site). Additional information on the flora and fauna of other, small natural remnants on the eastern side of the campus are presented, where possible. A detailed historical perspective is beyond the scope of this survey. However, it is apparent that the area has been subject to frequent disturbance, due to both natural and human causes. The area is known to have been used by the Defence Forces during WW2. The impact of Cyclone Tracey in 1974 is evident from aerial photographs (supplied by R. Billett). Prior to the Cyclone (May 1969 photo) there were many more large trees. However, there is evidence of considerable disturbance even in 1969, with access roads on all sides. The site has been subjected to high intensity fires for many years.

The study site is roughly bisected from north to south by a vehicular track along a sewage easement. For convenience, the areas on either side of this easement track were treated separately in this survey, as two portions. The East portion is bounded by the sewage easement on the west, the student residences on the east, the residential area of Brinkin to the north, and the proposed "Strand" of the Master Plan to the south. The West portion is bounded by the easement to the east, the University boundary fence to the west, and the Horticulture-Aquaculture complex and bridle-path to the south. There is a slight fall in elevation from west to east (Fig. 1).

4. TIMING AND SCOPE OF STUDY

The survey was mainly restricted to the transition period between the late Dry and early Wet seasons (September-October 1992). Storms were experienced in the latter month. The flora survey was conducted mainly from 19 September to 26 September 1992. The bulk of the fauna survey was carried out from 2 to 12 October 1992, with some supplementary observations in February 1993.

Due to considerations of expertise availability, and the time constraints imposed by the impressive pace of building developments, consideration was given only to the vertebrate fauna (i.e. invertebrates were ignored), and the woody flora (though some herbaceous species were noted).

5. METHODOLOGY

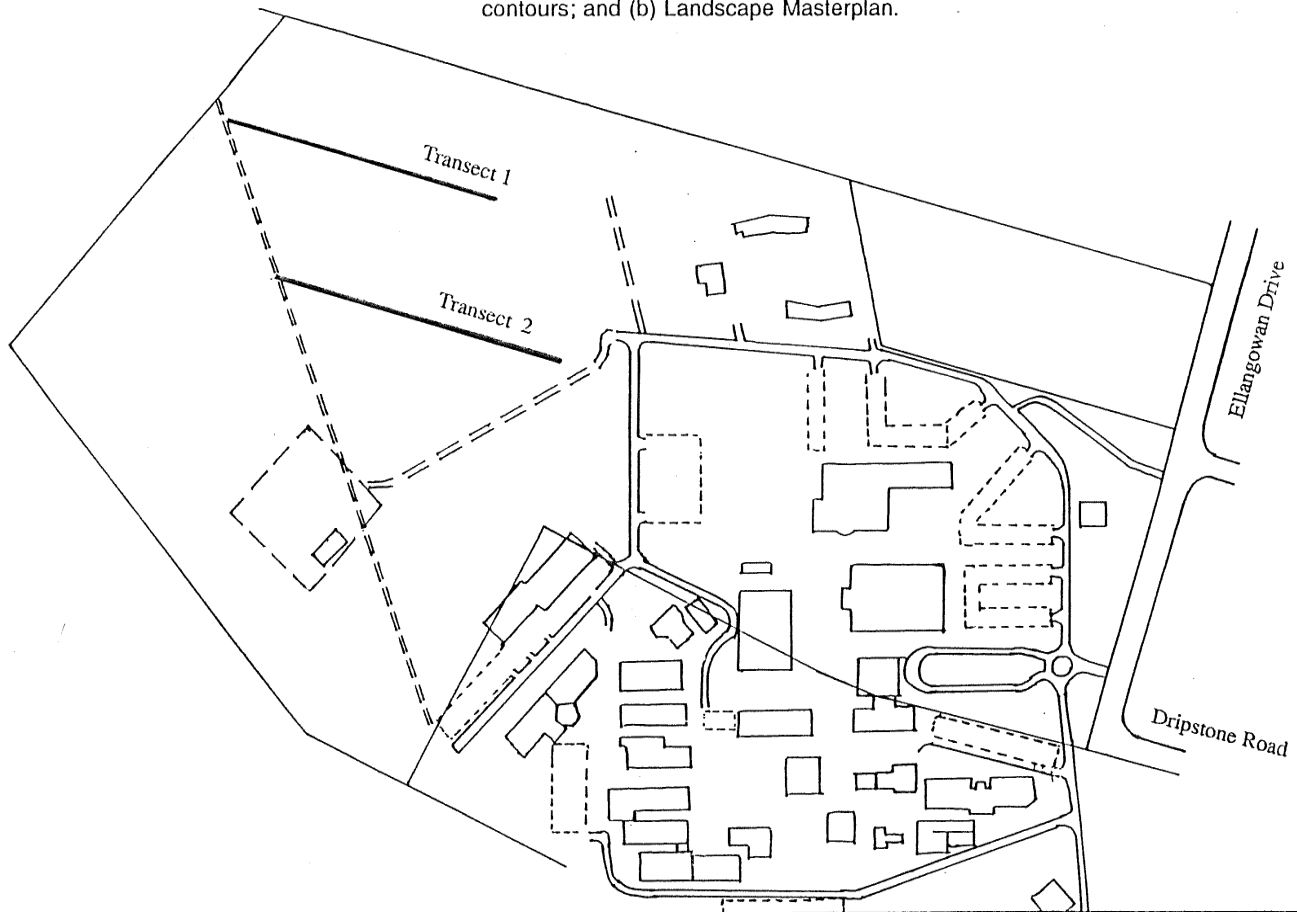
5.1 NATURAL RESOURCES

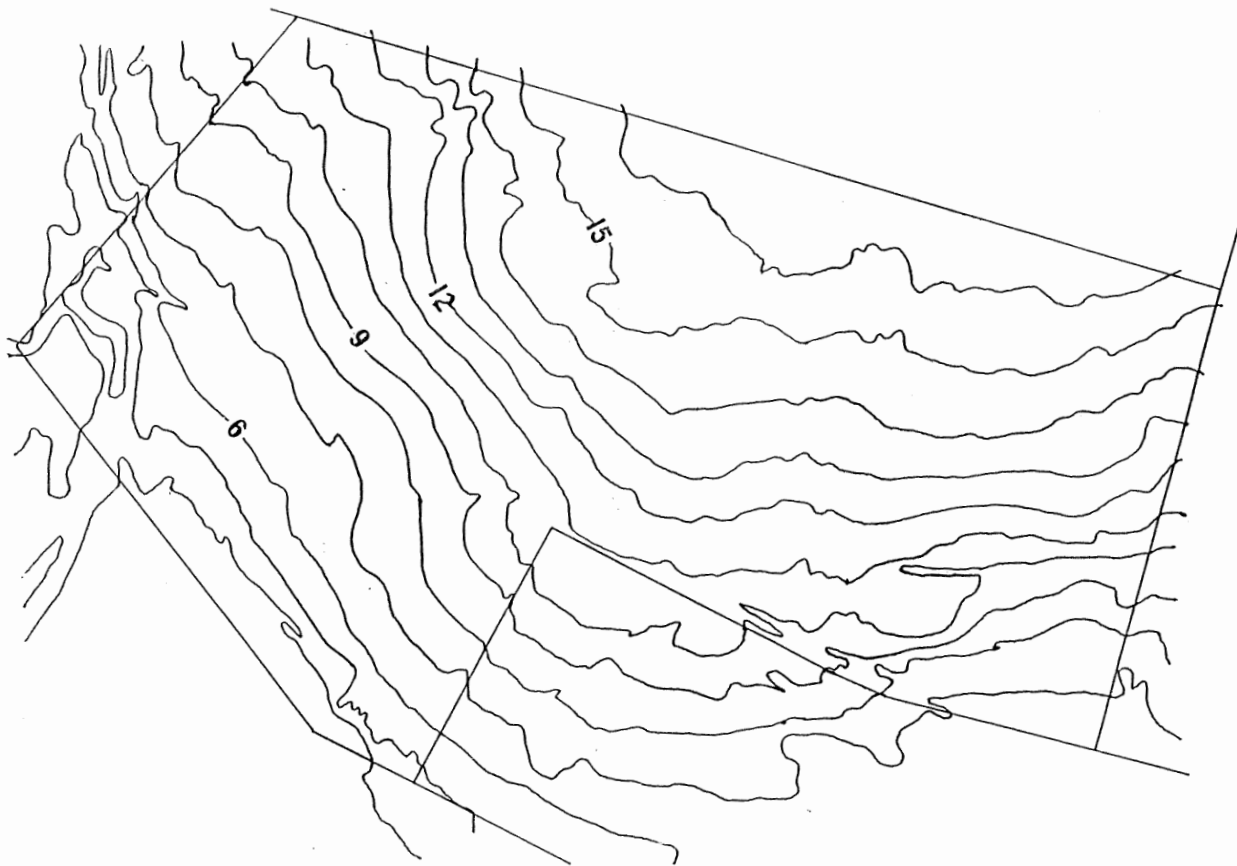
Preliminary observations indicated that the floristic composition of the site changed from one end to the other, along an environmental gradient running roughly east-west. In order to accurately describe these changes, a quantitative approach was adopted. This involved the establishment of two transects in the East portion, along which plants and animals could be sampled. The West portion was sampled qualitatively only, as it had been badly burnt some weeks prior to the commencement of the survey.

5.1.1 Transects

Two parallel, 300 m long, transect lines, approximately 140 m apart, were marked out with 1 m star pickets at 20 m intervals. The lines were initially established using a prismatic compass with a bearing of 104 degrees eastwards from the sewage easement track (Fig. 1). This bearing was chosen as it was parallel to the Brinkin housing fence line, and approximated the orientation of the proposed Strand line (Clouston Australia & Jane Coleman, 1992). Each transect terminated at the cleared eastern edge of the natural bushland.

Figure 1. Map of NTU Casuarina campus, showing location of transects of current survey with buildings and infrastructure (as at June 1990), with overlays of (a) 1 m contours; and (b) Landscape Masterplan.







5.1.2 Flora

At each 20 m interval along each transect, the star picket was taken as the centre-point of a 5 x 5 m quadrat plot (Fig. 2). The boundaries of each quadrat were temporarily marked using flagging tape, and all shrubs and trees (> 1 m high) within that plot identified and counted. The quadrat positions are shown in Fig. 1. In addition to these quadrats, the area between, and to the north, of the transects was thoroughly traversed to identify any other species not present on the transects. The location of any plants of interest was recorded using approximate bearings and distances from the nearest quadrat centre stake.

The flora of the West portion was sampled qualitatively, by listing plant species as they were encountered during intensive traversing of the sites.

5.1.3 Fauna

Herpetofauna

Reptiles were sampled using pitfall traps, supplemented by occasional searches. Because this technique is extremely labour-intensive, only five traps were dug: two along each transect line, and another c. 50 m west of Transect No. 1, which was located to sample reptiles in the open, burnt woodland of the north-western portion. Each trap consisted of a large plastic bucket (30 cm deep, 26 cm diameter at open end) placed in a hole, so that the top was flush with the ground. A 7 m long drift fence (25 cm high aluminium flywire mesh), supported by wire rods, was then erected so that the middle portion passed over the centre of the bucket (Fig. 2). The bottom edge of the fence was dug in below ground level, to avoid movement of reptiles beneath it.

Traps were operated from 17:00, 9 October to 17:00, 12 October, and checked three times during each day (09:00, 12:00 and 17:00). This checking schedule minimised the risk of captured animals dying due to heat stress or dehydration. Large leaves were also placed at the bottom of the buckets to provide shade. The traps were taken down and the holes re-filled with earth at the end of the sampling period.

Frogs were sampled on the nights of 1 and 2 February 1993. This sampling period followed heavy rains in late January. Sampling was restricted to inundated areas on and west of the easement track. As frogs were extremely difficult to locate in the thick grass, tape-recordings were made of calls, and identified later.

Birds

No systematic censusing was undertaken due to time constraints, and because of the brevity of the study (many species are highly seasonal). Instead, birds seen or heard on the site were noted opportunistically during the study. These observations are supplemented by a list of birds recorded on the campus (mostly the eastern half) over a much longer period from 1985 onwards.

Mammals

Small mammals were sampled over three nights along the two transects using 138 Elliott traps. Four traps (three medium size, one small) were positioned at the corners of each quadrat (see Flora survey), while five large traps were placed at even distances along the two transects (between quadrat plots) (Fig. 2). Traps were baited with a standard mixture of rolled oats, peanut butter and 'Pal' pet food. Trapping was conducted over three successive evenings from 2 to 4 October 1992. Traps were set at about 17:30, and checked at 07:00 the next morning to minimize the period of disturbance to the animals. Large mammals were recorded opportunistically.

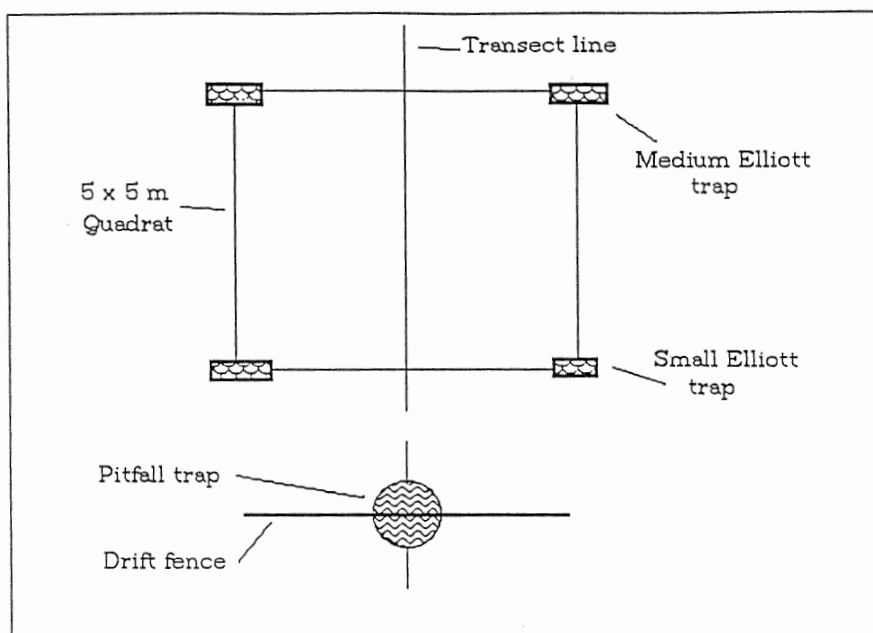


FIGURE 2. Design of quadrats and traps

5.2 EVALUATION OF RESOURCES

5.2.1 Conservation value

It is difficult to assess the conservation value of the campus environment without comparable information for other similar areas of bushland in the Darwin region. As such data do not exist, a flora survey was conducted in a large area of RAAF land (No. 2 Control and Reporting Unit) on the western side of Lee Point road, to the north of the Royal Darwin Hospital. Plant communities here were similar to those on the campus. This survey provided a useful comparison by which to assess the uniqueness and condition of the NTU campus flora.

For the purpose of this study, the term "significant" (pertaining to flora and fauna) was deemed to apply in the following situations:

- (1) belonging to a species which is locally uncommon;
- (2) represent significant habitat (plant communities) which are scarce in the regional or local context;
- (3) individuals with outstanding stature or in unusually high densities (in local context);
- (4) species of significant interest from an Aboriginal perspective (bush food/ medicine); or
- (5) species of significant interest from research perspective (primarily biochemical or ecological).

5.2.2 Educational and research value

The educational significance of the resources was evaluated using a questionnaire (Appendix D), which was sent to interested Casuarina campus lecturing and technical staff in the Science Faculty, Department of Horticulture (School of Technology, ITAFE) and Centre for Aboriginal

and Islander Studies (CAIS). This questionnaire attempted to identify the value attached to the natural remnants by staff, and to ascertain future demand for these resources.

5.2.3 Cultural value of resources

A detailed study of the cultural value of the plant and animal resources of the campus to the local aboriginal (Larrakia) people was outside the scope of this study. Instead, available literature regarding Aboriginal use of plants was consulted.

6. RESULTS OF FLORA AND FAUNA SURVEY

6.1 FLORA

The plant diversity of the site was unexpectedly high. A total of 114 native species, and six introduced species, were recorded (Table 1). The total included 54 species of trees, 40 shrubs, 13 vines, two palms, and one cycad (Appendix 1). In terms of its structure, the plant community of the East portion varies between tropical woodland and open forest, the canopy dominated by *Terminalia ferdinandiana*, *Acacia aulacocarpa* and *Eucalyptus tetrodonta*. A generalized east-west moisture gradient is indicated by the restriction of species typical of poorly-drained areas, such as *Pandanus spiralis* and *Lophostemon lactifluus* to the western end of the transects, and species tolerant of dry conditions (viz. *Calytrix exstipulata* and *Grevillea decurrens*) at its elevated, eastern end. Over the entire site, 38% of species were categorised as open forest endemics, 25% as vine forest endemics, 20% as "mixed forest" and 12%, mangroves (Appendix 2).

6.1.1 East Portion

During the transect survey in the East portion, 35 species of trees and shrubs were recorded in the quadrat plots (Table 2). Transect 2 possessed a greater number of woody trees and shrubs than the Transect 1. The highest number of woody plants was recorded in the middle of Transect 1, and at the eastern end of the Transect 2 (Fig. 3). The five most abundant species on both transects (in order of decreasing abundance) were Billygoat Plum *Terminalia ferdinandiana*, Green Plum *Buchanania obovata*, *Acacia aulacocarpa*, Cocky Apple *Planchonia careya*, and Darwin Stringybark *Eucalyptus tetrodonta* (Table 2).

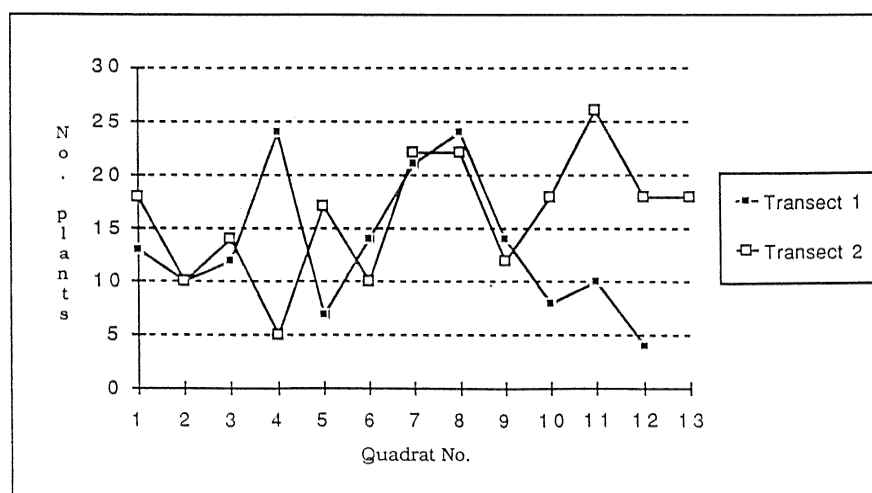


FIGURE 3. Number of woody plants counted on each transect

The tallest trees and shrubs occurred at the western end of Transect 1, and the eastern end of Transect 2 (Fig. 4). These trends are reflected in Fig. 5, showing that the proportion of shrubs (vs. trees) on Transect 1 is greatest at its eastern extremity, where Turkey Bush *Calyrix extipulata* occurs on the bare gravelly soil adjacent to the student residences. On Transect 2, the Sandpaper Fig *Ficus opposita* and *Pogonolobus reticulatus* made significant contributions to the understorey.

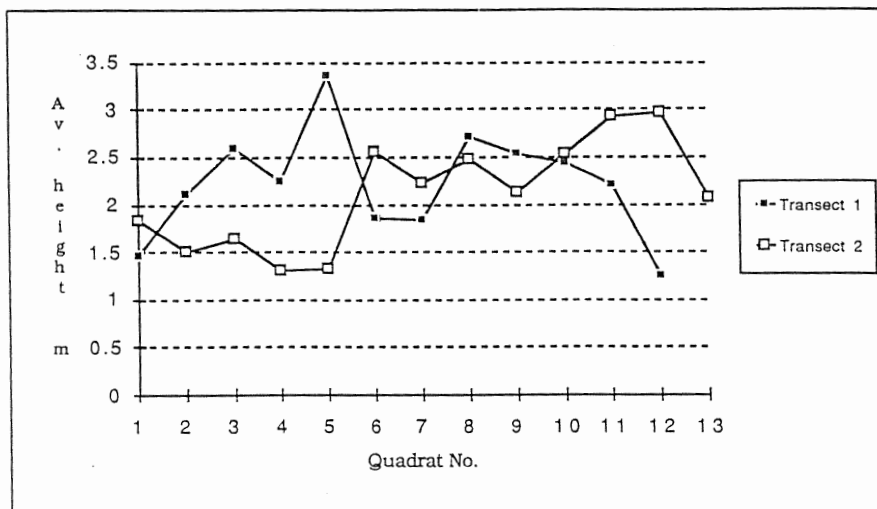


FIGURE 4. Mean height (m) of plants along transects

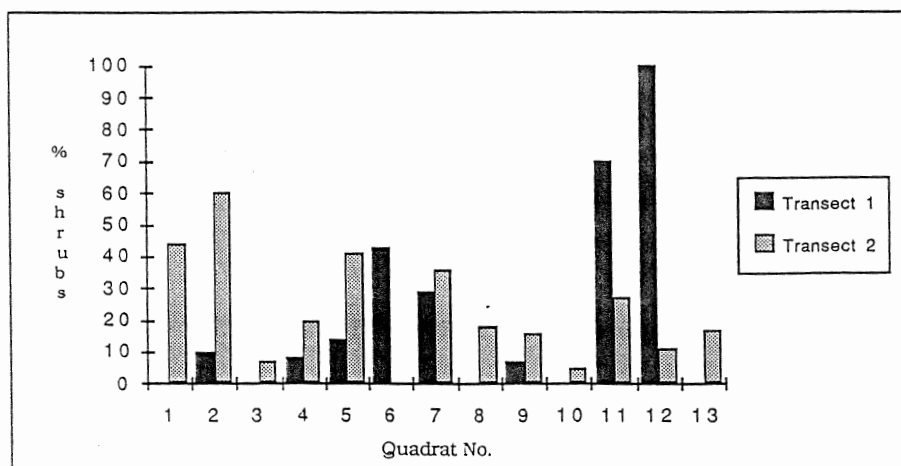


FIGURE 5. Percentage of shrubs (vs trees) along transects

Floristic richness was slightly greater on Transect 2 than on Transect 1, with 27 and 25 species respectively. The understorey of the transects featured a substantial component of "mixed forest" species (*Sterculia quadrifida*, *Canarium australium*, *Glochidion xerocarpum*, *Antidesma ghaesembilla*), species which are typical of vine forests, but not exclusive to them. The quadrats contained Of the nine species of mixed forest, or endemic vine forest, plants that were present in quadrat plots, five occurred on Transect 1, and seven on Transect 2. However, the abundance of such species on Transect 2 far exceeded that on the other transect (Fig. 6). A large proportion of these plants occurred as an understorey in a patch of open forest with a near-closed canopy of *E. tetradonta*, in Quadrat No. 9. In addition to the two vine forest species found only in this plot (viz. six *Carallia brachiata* and two *Ixora klanderana*), four other mixed/vine forest species were found within 20 m of the plot boundaries: *Buchanania arborescens* (two small saplings), *Breynia cernua* (one sapling) and *Timonias timon* (one tree).

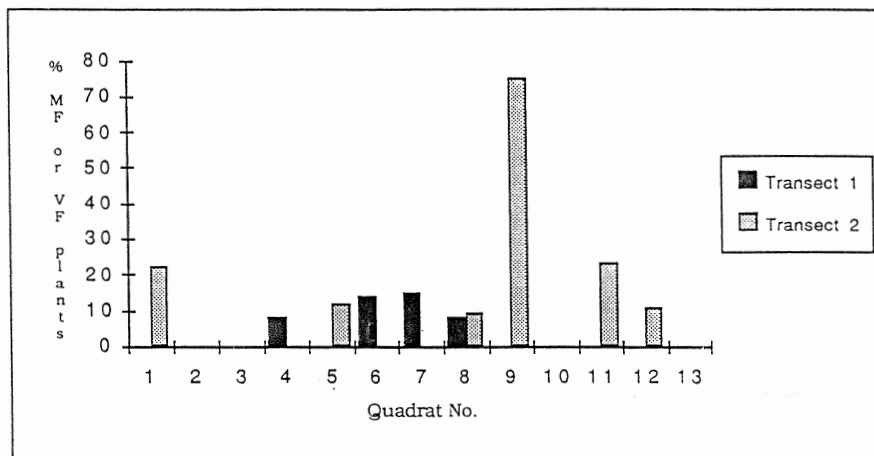


FIGURE 6. Percentage of individual plants of Vine Forest or Mixed Forest species along transects

Although little attention was paid to grasses, it was noted that the entire site was covered in the fire-promoting introduced Mission Grass *Pennisetum polystachion*.

6.1.2 West Portion

In the northern part of this portion, the woodland community is very similar to that of the adjoining eastern portion (on the other side of the easement track). However this area had been badly burnt some weeks prior to the study, and therefore lacked a grass layer. The southern part of this portion had similarly suffered from recent fires, but the floristic composition of the plant community altered dramatically towards the western boundary (Fig. 7). The flora along the boundary was comprised almost entirely of vine forest species, many of which are typical of coastal semi-deciduous vine thickets (=forests) on stabilised dunes. The vast majority of vine forest species occurring on the study site were restricted to this small area, and few were shared with the East portion.

Except for a tiny remnant of this formerly more widespread vine thicket, alongside mangroves in the south-western corner of the campus, most plants were in a state of regeneration due to recurrent fires, and less than 1 m high. A healthier, yet still very small, remnant of vine thicket occurs on the western edge of the bicycle track, just outside the University boundary.

6.1.3 Mangroves and fringing plant communities

Mangroves occur along the southern boundary of the campus. They form part of the Rapid Creek estuary. A large proportion of the Darwin Harbour mangrove flora (50% of those listed by Wightman 1989) occurs within 200 m of the University boundary, especially along the stormwater drainage channel (R. Noske, pers. obs.). Regeneration has been good (Guinea 1988), mainly because there has been little disturbance since the area was cleared, and because fires rarely penetrate mangroves, due to the absence of fuel on the ground.

Due to earthworks and road-building around the edge of this habitat, the typical "buffer zone" of paperbarks and pandanus behind the mangroves has been lost. The present mangrove fringe is severely degraded, and to a large extent overgrown with the introduced Coffee Bush *Leucaena leucocephala*. Some vestiges of the buffer zone are evident behind the Horticulture-Aquaculture compound.

6.2 FAUNA

6.2.1 Herpetofauna

The list of frogs and reptiles recorded on the campus is doubtless incomplete (Table 3). Those recorded are widespread species, common in the Top End of the Northern Territory (Tyler & Davies 1986; Horner 1992). The Northern Dragon *Gemmatophora temporalis* is abundant throughout the campus, especially among the trees surrounding the ovals. The co-existence of two species of Rainbow Skinks, *Carlia rufilatus* and *C. amax*, in the open forest at the eastern end of Transect 2 warrants further investigation, as the two species are morphologically and ecologically very similar. A shed snakeskin in the West portion indicates that snakes occur on the site.

6.2.2 Birds

A total of 96 species of birds have been recorded on the campus (including the mangroves along the storm water channel), of which 30 were seen on the study site during the fieldwork period (Table 4). Eighteen species are known to breed on the campus (Peaceful Dove, Weebill and Double-barred Finch on the site during this study). Of special interest is the nesting of Bush Thick-knees *Burhinus magnirostris* in the small wooded lot on the northern side of Building 23 (Nursing) carpark. Although this species is common in the Darwin region, the occurrence of a resident breeding pair (Plate 7) on the campus is quite extraordinary.

Another unusual bird that attracted some attention from staff and students at the University was a single Orange-footed Scrub-fowl *Megapodius freycinet* that frequented the vicinities of Buildings 18 and 28 for several months during 1990. The species is normally found in monsoon vine forests, and this individual probably originated from Casuarina Coastal Reserve (only 1 km to the north). In 1991, a pair of Tawny Grassbirds *Megalurus timoriensis* inhabited the thick grassland between the old Horticulture compound and the earthen wall behind the mangroves. This species disappeared from the campus after this vegetation was removed in 1992.

6.2.3 Mammals

In contrast to the prolific avifauna, the mammalian fauna of the campus is depauperate (Table 3). Over a total of 414 trap-nights (138 traps over three nights), only one animal was caught: a young bandicoot. Thus the trap success rate was of 0.002 animals per trap-night. Using traps of the same type used in this study, Smith (1980) caught three bandicoots, two Grassland Melomys *Melomys burtoni* (a native rat of the moonsonal tropics) and four Black Rats *Rattus rattus* (an introduced species) over 144 trap-nights, giving a success rate of 0.063 animals per trap-night. However, using small and medium Tomahawk cage traps, 53 bandicoots were caught over 192 trap-nights (0.276 animals per trap-night).

The poor trap success experienced during the present study could be due to a number of factors: Smith's (1980) trapping grid was south of the study site, between the mangroves and the present-day Building 3 (Trade Auto/ Refrigeration Classrooms). The vegetation at this site, described as having few trees, was apparently less dense than that of the East portion, so it is unlikely that the former supported more bandicoots than the latter. Secondly, her study was conducted during the Wet season (February) when the vegetation was "luxuriant", whereas our survey was conducted in the late Dry. Thirdly, it is clear from Smith's study that Elliott traps are not as efficient at capturing bandicoots as Tomahawk traps.

The complete lack of other small mammal records in this survey suggests that other factors may be operating. Indeed, there is some evidence to suggest that small mammals in the Darwin region have declined in the last decade, probably due, in part at least, to predation by cats (and possibly, dogs). In 550 trap-nights around a vine forest near Leanyer, only one Grassland *Melomys* was caught; the trap success (0.002) was identical to that of the present study. Small mammals have apparently declined at Holmes Jungle in recent years (K. Martin, pers. comm.; pers. obs.). Small, terrestrial mammals cannot fly, and have little defence against the introduced cat, of which there are many on the campus. W. Panton (pers. comm.) observed a cat eating a Northern Dragon near the former Aboriginal Task Force buildings. In contrast, the larger Agile Wallaby and Dingo still utilise the campus. Indeed, the pack of campus Dingoes is well-known to some University grounds staff, though it probably ranges over a much larger area.

Hundreds of Common Bentwing Bats and several of the less abundant Large-footed Mouse-eared Bats roost in the large stormwater drainpipe outlet near Building 19 (Printery), and the smaller drainpipe further downstream (near Alawa Oval Scout Hall). Some of these bats have been banded by Jenni Webber (NT Museum).

7. VALUE OF RESOURCES

7.1 CONSERVATION VALUE

The monsoon vine forests (also called monsoon rainforests or "jungle") of north-west Australia have attracted much scientific attention in recent years, largely because they represent plant communities of vastly different structure and composition to the eucalypt-dominated open forests and woodlands typically surrounding them (e.g. McKenzie *et al.* 1991; Wightman & Andrews 1989). There is considerable concern for the security of vine forests, because of their fragmented distribution, their small size (and consequent high edge to area ratio), and their relatively fire-sensitive vegetation (Russell-Smith & Bowman 1992).

Panton (in prep.) identified four edaphic settings for vine forests in the Darwin area: (1) laterites of the Tertiary period (with acidic soils); (2) cheniers of Holocene age (with basic or alkaline soils, less than 4,500 years old); (3) alluvial loam associated with watercourses, and (4) cliff faces. Panton showed that over 60% of the original vine forest cover of Darwin has disappeared since 1945. The greatest loss of vine forest in this 45-year period is attributable to urban development, while the indirect human effects of weed invasion and increased fire frequency (and their interaction) are responsible for more recent contraction. Cyclone Tracey, by itself, was found to have had little long-term effect on vine forests. Of the 14 discrete patches of vine forest in 1945, only nine remain and eight of these are retreating (Panton in prep.). For these reasons, almost any patch of vine forest is precious and worthy of protection.

The NTU campus is fortunate in having representatives of two edaphic settings: the Holocene chenier along the western boundary, and Tertiary laterites in the East portion. The distinctiveness of these two substrates is reflected in the floras they support. Species typical of cheniers (rare on laterites) include *Cathormium umbellatum*, *Pongamia pinnata*, *Hibiscus tiliaceus*, *Phyllanthus ciccoides* and *Cordia dichotoma*. Species of lateritic vine forests (scarce or absent on cheniers) include *Buchanania arborescens*, *Carallia brachiata* and *Antidesma ghaesembilla*. Edaphic factors, therefore, explain, to a large extent, the profound differences in the floristics of the two sites. *Antidesma ghaesembilla* is often characteristic of expanding vine forest margins (W. Panton, pers. comm.). Its presence, alongside several other vine forest

species, in the East portion, may indicate that this woodland/ open forest would eventually be replaced by a vine forest, if protected from fires.

Many of the vine/ mixed forest species are represented by only one or two individuals. Their status could thus be described as very insecure. This is particularly so, given that the introduced Mission Grass *Pennisetum polystachion* covers much of the site. This perennial species produces much higher fuel loads than the native annual speargrass *Sorghum intrans*, and thus, promotes fire.

Forty-one species of plants occurring at the Lee Point RAAF Base were not encountered on campus (Appendix 3). Most of these are vine forest species (28), with an additional eight of "mixed forest". The greater number of vine forest species at Lee Point is to be expected, since the area has had little disturbance. Of the plants recorded on campus, 21 species were not encountered at the Lee Point site (Table 1). Twelve of these are vine forest species. Of these, three are generally uncommon in vine forests in the Darwin area (W. Panton, pers. comm.), viz. *Carallia brachiata*, *Timonias timon* and *Buchanania arborescens*. One open forest species, *Pogonolobus reticulatus*, is also generally rare in the Darwin area.

7.2 EDUCATIONAL VALUE

7.2.1 Undergraduate teaching

Ten questionnaires were sent out, and a response was received from each person. All respondents indicated that they used the bush remnants for teaching purposes more than twice a year, in one case at least once a week. A total of 15 units, from five different undergraduate courses, were identified as utilising the remnants (Table 5). The following educational uses were identified:

- (1) Collection of plants and insects for laboratory classes in biological diversity, plant anatomy and physiology;
- (2) *in situ* plant physiological experiments ;
- (3) demonstration of biological field techniques and field identification of flowering plants; and
- (4) research projects concerning particular species of plants and animals.

Questionnaire respondents unanimously agreed that the existence of natural resources on the campus was a great advantage, in terms of reducing the considerable time, and/ or transport costs that are usually associated with fieldwork and the collection of biological specimens for practical classes. All respondents believed the remnants should be preserved for the above reasons. Some expressed the view that as much as possible of the remaining bushland should be retained as a valuable teaching/ research resource. Joan Dillon (Department of Horticulture, ITAFE) envisages an expansion in the use of these resources in several award and non-award units (Appendix 4).

7.2.2 Research projects on campus

(a) Breeding biology of birds (R. Noske, Science Faculty)

The campus has proved fertile ground for studies of the breeding biology of wet-dry tropical birds. Almost nothing is known of the breeding frequency, length of nesting cycles and reproductive success of birds in north-western Australia. The main focus of this work is the Rufous-banded Honeyeater *Conopophila albogularis*, a species which is arguably Darwin's commonest bird. It has adapted well to the urban environment, filling the niche usually reserved for introduced species, such as sparrows and starlings, none of which occur in Darwin. The breeding efforts of a dozen pairs (most members of which are colour-banded for individual recognition) have been monitored twice a month since 1988, and some of the original birds are still alive at the time of writing. This study is the first of its kind. Apart from providing detailed

information on a tropical honeyeater, it will provide some insight into the fecundity of native birds under the near predator-free conditions of suburbia.

Other species for which a considerable amount of data has been obtained from the campus include the Figbird *Sphecotheres viridus*, and Peaceful Dove *Geopelia striata*. Both these species and the Rufous-banded Honeyeater have been studied on the developed, eastern side of the campus. One species which occurs only in the undeveloped areas is the tiny Weebill *Smicrornis brevirostris*. This species is currently being watched for evidence of cooperative breeding, where three or more adults participate in the raising of young of one nest.

(b) Biology of the cycad *Cycas armstrongi* (S. Chirgwin, Science Faculty)

As part of an ongoing study of the growth rate and reproductive phenology of *Cycas* species throughout the Top End, a small population of *C. armstrongi* (Plate 1) adjacent to the Horticulture-Aquaculture complex has been monitored since 1989. Data collected include: date of leaf drop, date of infestation with sawfly larvae, date of production and period of viability of reproductive structures, and post-burning regrowth rates.

(c) Pollination ecology of the Cocky Apple *Planchonia careya* (R. Noske & G. Palmer)

The distinctive flowers (Plate 2) of this typical Top End woodland species open on dusk and are shed by mid-morning of the following day. They are presumed to be pollinated by fruit-bats (flying foxes) but hard evidence is lacking; they are also visited by a variety of honeyeaters and insects during their brief lives. Observations of flowering on ten tagged trees in the remnant north of the current CAIS buildings suggest that the species produced nectar over night, but despite the lack of bat visitors, fruit set is high.

(d) Microchiropteran bats of the stormwater drainpipes (J. Webber, NT Museum)

At least two species of insectivorous bats roost in the stormwater drainpipes between the campus and Alawa ovals (see sub-section 6.2.3). Many of these animals have been banded under the Australian Bird and Bat Banding Scheme of the Australian National Parks and Wildlife Service.

(e) Plant chemistry of native flora (D. Fenn, Science Faculty)

Although not presently utilising the Casuarina campus, David Fenn (School of Chemistry & Earth Sciences, Myilly Point) has expressed keen interest in maintaining populations of many native plant species there for use in third year (SCH 310) and Honours plant chemistry projects. Extracted chemical compounds of interest include alkaloids, fatty acids, phenols, quinones and plant colouring matter. Several vine forest species on the campus are reported to have anti-bacterial (*Flueggea virosa*), anti-spasmodic (*Litsea glutinosa*) and Ultra-violet blocking (*Exocarpus latifolius*) actions. One open forest shrub species (*Pogonolobus reticulatus*) and several herbaceous species (e.g. *Haemodorum*, *Gomphrena*) are known sources of dye, and are worthy of further investigation as colouring agents (D. Fenn, pers. comm.).

7.3 CULTURAL VALUE

Historically, the land upon which the Casuarina campus of the University (originally the Darwin Community College) was built, belonged to the Larrakia Aboriginal people (Heffernan 1992). Prior to settlement by Europeans, the area (from present-day Brinkin to the mouth of Rapid Creek) is said to have supported a spring-fed creek and a substantial monsoon vine forest which included Carpentaria palms. Before the College site was cleared, it was used extensively for hunting and foraging by local aborigines (B. Risk, pers. comm.). The southern margin of the campus, along the old bicycle track, is still used by Aboriginal people as an access route to the beach; and the adjoining oval is used as a camp close to the mangroves, where "longbum" snails and crabs are sought (A. Dunlop, pers. comm.).

Table 6 summarises the known traditional Aboriginal uses of some of the plants on the study site. Examples of highly regarded bush tucker plants are *Buchanania obovata* (Green Plum), *Sterculia quadrifida* (Peanut Tree), *Vitex glabrata* (Black Plum), *Terminalia ferdinandiana* (Billy-goat Plum), *Antidesma ghaesembilla* (Black Currant), *Flueggia virosa* (White Currant), and *Carallia brachiata*. Species with many medicinal uses include the trees, *Erythrophleum chlorostachys* (Ironwood), *Hibiscus tiliaceus* (Beach Hibiscus); shrubs, *Capparis umbonata* (Bush Orange), *Clerodendrum floribundum*, *Ficus opposita* (Sand-paper Fig), fan palm *Livistona humilis*; and vines, *Tinospora smilacina* (Snake Vine) and *Protoasparagus racemosus* (Native Asparagus).

7.4 SIGNIFICANT FLORA

As argued above (7.1), any monsoon vine forest in the Darwin area has high conservation value. The remnant vine thicket at the southern end of the West portion of the campus (including the regenerating patch along the western boundary) is highly significant, not only because it supports a dwindling habitat, but because much of its flora is found nowhere else on campus, and many of these plants represent important Aboriginal "bush tucker" or "bush medicine" sources.

In the East portion, several significant or interesting individual plants or floristic associations were identified (Fig. 7). These are described below, followed in brackets by their location relative to the nearest transect marker (transect no./ quadrat stake no./ directional bearing from stake/ distance from stake):

- A. Large Swamp Box *Lophostemon lactifluus*, about 6 m high. Regarded as good fire wood by Aboriginal people. (1/ 4)
- B. Two groups of White Apple *Syzygium eucalyptoides* (six trees in all), significant for their size (7-8 m high), and attractiveness to birds. (1/ 7/ 350°/ 7m)
- C. Unusually large patch of Black Currant *Antidesma ghaesembilla*, about 20 m in diameter. Also several specimens of *Bridelia tomentosa* (another mixed forest species): edible fruit and source of blue dye for Aboriginal people. (2/ 6/ 54°/ 15m)
- D. Single specimens of *Timonius timon* (2 m high) and *Breynia cernua* (0.5 m high): vine (mixed) forest species occurring as understorey in open forest. (2/ 8/ 250°/ 6m)
- E. Patch of Peanut Tree *Sterculia quadrifida* (6 trees, c. 5 m high): significant "bush tucker" species. (2/ 9/ 350°/ 6m)
- F. Dense patch of *Glochidion xerocarpum*, plus several tall *Bridelia tomentosa* (4 m) and one *Breynia cernua* (1 m) just to east of quadrat. (2/ 10)
- G. Large, attractive Milkwood *Alstonia actinophylla*: significant for its size (c. 12 m high). Has been nominated for inclusion on "National Trust Significant Tree Register" (Greening Australia); also surrounded by *Sterculia quadrifida* (4) and *Brachychiton diversifolius* (5). (2/ 11/ 330°/ 25m)
- H. Small patch of *Pittosporum melanospermum*: (8 trees; c. 5 m high): only known patch on campus. (1/ 10/ 150°/ 45m)

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 CONCLUSIONS

The campus supports a surprisingly rich flora. Most significant are the monsoon vine forest plants, some of which are locally uncommon. The diversity of these plants is to some extent attributable to the presence of two distinctive edaphic (geomorphological) settings: coastal cheniers and laterite ridges. However the plant community of the former is severely degraded, and in desperate need of sensitive management. Two weed pests (Mission Grass and Coffee Bush) are identified, the former constituting a significant fire threat to the remnants because of its characteristic high fuel load and persistence times.

The remnants (including the study site and other smaller patches of bush) are heavily utilised and highly valued by NTU Casuarina staff in Science, Horticulture and CAIS. They are used for a variety of purposes in the teaching of undergraduate courses, and for several research projects. There is great potential to use these remnants further, especially when the Myilly Point Science staff move to Casuarina. Many of the plants occurring on the campus are highly regarded sources of food or raw materials for craftwork by Aboriginal people.

None of the animals recorded on the study site (or elsewhere on the campus) represent rare or endangered species. One species of mammal (Grassland Melomys) and one species of bird (Tawny Grassbird) may have disappeared from the campus in recent years, and another mammal (Northern Brown Bandicoot) may have declined in the last decade. Continued (or enhanced) regeneration of the vine forest could encourage some species of animals to recolonise the site.

8.2 RECOMMENDATIONS

The following recommendations are made:

1. The severely-degraded but highly significant monsoon vine thicket on the western edge of the campus requires urgent management, particularly fire exclusion.
2. A belt of open forest-woodland, roughly following Transect 2 (from its eastern end, west to the sewage easement), should be preserved in its entirety for the following reasons:
 - (a) it represents a natural environmental gradient with a changing flora;
 - (b) it contains a rich flora, including a substantial component of significant plants;
 - (c) cutting this belt into smaller fragments may well reduce its integrity, and alter drainage patterns; and
 - (d) it provides a corridor for fauna and flora. Of particular interest is the area around Quadrat 9 (Transect 2), which supports many monsoon vine or mixed forest plant species.

Most urgently, dumping of soil directly adjacent to this patch, and the eastern end of the transect should cease immediately, especially since a large area of barren ground adjacent to the Student Residences is available for such purposes (if it is necessary).

3. Several other identified patches of significant plants should be retained, where at all possible, and managed sensitively. Some of these contain plants of educational or cultural value. Disturbance to significant individual trees should be minimised.
4. The introduced grass *Pennisetum polystachion* should be controlled and eliminated where possible, using techniques already adopted for the Leanyer vine forest (where University research is taking place).
5. Coffee Bush along the southern edge of the campus should be controlled, and in areas adjacent to mangroves be replaced by plantings of Pandanus and paperbarks. Individual Coffee bush plants in the eastern and western extremities of the East portion should be eliminated before they spread farther.

6. Stray domestic (feral) cats should be controlled where possible, to allow the return of native mammals.
7. The occurrence of a roost of Common Bent-wing and Large-footed Mouse-eared Bats in two storm-water pipes on the campus should be given consideration if any drainage works are planned.

An alternative to the building-centred approach of the Masterplan is one which first considers the preservation of natural features in the landscape. This approach is exemplified by Griffith University in southern Queensland, where buildings were sited around the native trees. This could be achieved on the NTU Casuarina campus by marking out areas and individual plants to be retained, and including penalty clauses in building contracts for any damage incurred in building operations.

The preservation, management and restoration of remnants would provide the University with a unique educational environment. These natural resources could be highlighted for the University and wider community by the provision of paths with interpretive signs/ display boards, and a brochure and/or map which refers to labelled trees along such paths. Interpretive materials should include information on the biology, ecology and Aboriginal uses of interesting plants. This idea has already been implemented at James Cook University in north Queensland, where a Field Guide to the campus plants has also been produced.

This approach, whilst representing a major change in the direction of the Landscape Masterplan, is wholly consistent with its objective of providing a unique environment, which protects and enhances the existing conservation values of the area. This survey has demonstrated the considerable conservation, educational and cultural value of the bushland remnants on the campus. The University has a responsibility to preserve and manage these resources wisely.

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10. REFERENCES (number in brackets, see Table 6)

- Brock, J. (1988). *Top End Native Plants*. J. Brock, P.O. Box 38543, Winnellie (1)
- Clouston Australia & Jan Coleman (1992). *Northern Territory University Landscape Masterplan*. Prepared for Northern Territory University.
- Guinea, M. (1988). Rapid Creek mangrove regeneration, 13 years onwards. Pp. 208-213 in Larson, H.K., Michie, M.G. & J.R. Hanley (eds), *Darwin Harbour: Proceedings of a Workshop on Research and Management*. Australian National University North Australia Unit, Mangrove Monograph No.4.
- Heffernan, S. (1992). *Rapid Creek (Gurumbai)*. Greening Australia Inc., Darwin.
- Horner, P. (1992). *Skinks of the Northern Territory*. NT Museum of Arts and Sciences, Handbook Series No.2, Darwin.
- McKenzie, N.L., Johnston, R.B. & P.G. Kendrick (1991). *Kimberley Rainforests of Australia*. Surrey Beatty & Sons, Chipping Norton, NSW.
- Panton, W.J. (in press). The factors affecting monsoon rain forests in the Darwin area. *Australian Geographer*.
- Russel-Smith, J. & D.M.J.S. Bowman (1992). Conservation of monsoon rainforest isolates in Northern Territory, Australia. *Biological Conservation* 59, 51-63.
- Smith, J.R. (1980). A study of the marsupial bandicoot *Isodon macrourus* in Darwin. Unpublished project report (Certificate of Env. Biol.), Darwin Community College.
- Smith, N.M. & G.M. Wightman (1990). *Ethnobotanical Notes from Belyuen, Northern Australia, Australia*. N.T. Botanical Bulletin No. 10. Conservation Commission of NT, Darwin. (5)
- Tyler, M.J. & M. Davies (1986). *Frogs of the Northern Territory*. Conservation Commission of NT, Darwin.
- Wightman, G.M. (1989). *Mangroves of the Northern Territory*. Conservation Commission of NT, Darwin.
- Wightman, G.M. & L. Mills (1991). *Bush Medicine Identikit*. Conservation Commission of NT, Darwin. (3)
- Wightman, G.M. & M. Andrews (1989). *Plants of Northern Territory Monsoon Vine Forests*. Conservation Commission of NT, Darwin.
- Wightman, G.M. & M. Andrews (1991). *Bush Tucker Identikit*. Conservation Commission of NT, Darwin. (2)
- Wightman, G.M. & N.M. Smith (1989). *Ethnobotany, vegetation and floristics of Milingimbi, Northern Australia*. N.T. Botanical Bulletin No. 6. Conservation Commission of NT, Darwin. (4)

TABLE 1. Taxonomic list of plant species found at NTU Casuarina Campus

The life form (LF) of each species is given where H=annual herb; P=palm; F=fern; S=shrub (understorey species); M=mistletoe; T=tree (canopy species); C=cycad; L=lily; V=vine; *=introduced weedy species.
N.B. List of herbs and vines not comprehensive.

Predominant habitat (HAB) classifications are: (OF) eucalypt-dominated Open Forest, (VF) Monsoon Vine Forest, (MF) Mixed Forest, (MA) mangroves, (CD) Coastal Dune, and (RI) Riparian Forest.
N.B. MF species are generally vine forest species which commonly grow within open forest.

Names printed in bold letters signify those species NOT found on Lee Point survey

| | LF | HAB | | LF | HAB |
|------------------------------------|----|-----|-------------------------------------|----|-----|
| ACANTHACEAE | | | CONVOLVULACEAE | | |
| <i>Acanthus ilicifolius</i> | S | MA | <i>Ipomoea pes-caprae</i> | V | CD |
| AMARANTHACEAE | | | <i>Ipomoea quamoclit</i> * | V | VF |
| <i>Gomphrena canescens</i> | H | OF | CYCADACEAE | | |
| ANACARDIACEAE | | | <i>Cycas armstrongii</i> | C | OF |
| <i>Buchanania arborescens</i> | T | VF | EBENACEAE | | |
| <i>Buchanania obovata</i> | T | OF | <i>Diospyros calycantha</i> | S | MF |
| ANNONACEAE | | | EUPHORBIACEAE | | |
| <i>Miliusa brahei</i> | T | VF | <i>Antidesma ghaesembila</i> | S | MF |
| APOCYNACEAE | | | <i>Breynia cernua</i> | S | MF |
| <i>Alstonia actinophylla</i> | T | MF | <i>Bridelia tomentosa</i> | S | MF |
| <i>Tabernaemontana pendacaulis</i> | S | MF | <i>Excoecaria ovalis</i> | T | MA |
| <i>Wrightia pubescens</i> | S | MF | <i>Flueggia virosa</i> | S | VF |
| ARECACEAE | | | <i>Glochidion zercarpum</i> | S | MF |
| <i>Livistona humilis</i> | P | OF | <i>Mallotus nesophila</i> | T | VF |
| ASCLEPIADACEAE | | | <i>Petalostigma quadriloculare</i> | S | OF |
| <i>Gynnanthera nitida</i> | V | VF | <i>Phyllanthus ciccoides</i> | V | VF |
| BIGNONIACEAE | | | FABACEAE | | |
| <i>Dolichandrone filiformis</i> | S | OF | <i>Flemingia</i> sp. | V | OF |
| BIKACEAE | | | <i>Macroptilium atropurpureum</i> * | V | VF |
| <i>Cochlospermum fraseri</i> | T | OF | <i>Pongamia pinnata</i> | T | VF |
| BOMBACACEAE | | | FLAGELLARIACEAE | | |
| <i>Bombax ceiba</i> | T | VF | <i>Flagellaria indica</i> | V | MF |
| BORAGINACEAE | | | HAEMODORACEAE | | |
| <i>Cordia dichotoma</i> | T | VF | <i>Haemodorum coccineum</i> | H | OF |
| BURSERACEAE | | | LAURACEAE | | |
| <i>Canarium australianum</i> | T | MF | <i>Litsea glutinosa</i> | T | VF |
| CAESALPINIACEAE | | | LECYTHIDACEAE | | |
| <i>Erythrophleum chlorostachys</i> | T | OF | <i>Planchonia careya</i> | S | OF |
| <i>Peltophorum pterocarpum</i> | T | VF | LILIACEAE | | |
| CAPPARACEAE | | | <i>Crinum angustifolium</i> | L | OF |
| <i>Capparis sepia</i> | V | VF | <i>Protoasparagus racemosus</i> | L | MF |
| <i>Capparis umbonata</i> | S | OF | LOGANIACEAE | | |
| COMBRETACEAE | | | <i>Strychnos lucida</i> | T | MF |
| <i>Lumnitzera racemosa</i> | T | MA | LORANTHACEAE | | |
| <i>Terminalia ferdinandiana</i> | T | OF | <i>Decasina</i> sp. | M | OF |

Table 1 continued

| | | | | | |
|----------------------------------|---|----|-----------------------------------|---|----|
| MALVACEAE | | | PTERIDACEAE | | |
| <i>Hibiscus tilliaceous</i> | T | VF | <i>Acrostichum speciosum</i> | F | MA |
| <i>Thespesia populneoides</i> | T | VF | RHIZOPHORACEAE | | |
| <i>Sida cordifolia</i> * | H | OF | <i>Bruguiera exaristata</i> | T | MA |
| | | | <i>Bruguiera parviflora</i> | T | MA |
| MELIACEAE | | | <i>Carallia brachiata</i> | T | VF |
| <i>Xylocarpus mekongensis</i> | T | MA | <i>Ceriops tagal</i> | T | MA |
| | | | <i>Rhizophora stylosa</i> | T | MA |
| MENISPERMACEAE | | | RUBIACEAE | | |
| <i>Pachygone ovata</i> | V | VF | <i>Borreria</i> sp | H | OF |
| <i>Tinospora smilacina</i> | V | MF | <i>Ixora klanderana</i> | S | VF |
| | | | <i>Gardenia megasperma</i> | S | OF |
| MIMOSACEAE | | | <i>Pogonolobus reticulatus</i> | S | OF |
| <i>Acacia aulacocarpa</i> | T | OF | <i>Scyphiphora hydrophyllacea</i> | S | MA |
| <i>Acacia auriculiformis</i> | T | OF | <i>Timonias timon</i> | T | MF |
| <i>Acacia holosericea</i> | S | OF | | | |
| <i>Acacia oncinocarpa</i> | S | OF | SANTALACEAE | | |
| <i>Acacia dimidiata</i> | S | OF | <i>Exocarpos latifolius</i> | S | MF |
| <i>Acacia latescens</i> | S | OF | | | |
| <i>Acacia umbellata</i> * | S | OF | SAPINDACEAE | | |
| <i>Cathormium umbellatum</i> | T | VF | <i>Allophylus cobbe</i> | S | VF |
| <i>Leucaena leucocephala</i> * | T | RI | <i>Atalaya variifolia</i> | S | OF |
| | | | <i>Cupaniopsis anacardioides</i> | T | MF |
| MORACEAE | | | SAPOTACEAE | | |
| <i>Antiaris toxicaria</i> | T | VF | <i>Planchonella pohlmaniana</i> | T | OF |
| <i>Ficus hispida</i> | T | VF | | | |
| <i>Ficus opposita</i> | S | OF | SMILACACEAE | | |
| <i>Ficus scobina</i> | S | VF | <i>Smilax australis</i> | V | MF |
| MYRSINACEAE | | | SONNERATIACEAE | | |
| <i>Aegiceras corniculatus</i> | S | MA | <i>Sonneratia alba</i> | T | MA |
| MYRTACEAE | | | STERCULIACEAE | | |
| <i>Calytrix exstipulata</i> | S | OF | <i>Brachychiton diversifolia</i> | T | OF |
| <i>Eucalyptus bleeseri</i> | T | OF | <i>Brachychiton megaphylla</i> | S | OF |
| <i>Eucalyptus clavigera</i> | T | OF | <i>Helicteres isora</i> | S | MF |
| <i>Eucalyptus miniata</i> | T | OF | <i>Sterculia quadrifida</i> | T | MF |
| <i>Eucalyptus papuana</i> | T | RI | | | |
| <i>Eucalyptus porrecta</i> | T | OF | TACCACEAE | | |
| <i>Eucalyptus tetradonta</i> | T | OF | <i>Tacca leontopetaloides</i> | H | OF |
| <i>Lophostemon lactifluus</i> | T | OF | | | |
| <i>Melaleuca cajupui</i> | T | RI | TILIACEAE | | |
| <i>Melaleuca leucodendra</i> | T | RI | <i>Grewia retusifolia</i> | H | OF |
| <i>Melaleuca viridiflora</i> | T | RI | | | |
| <i>Osbornia octodonta</i> | S | MA | ULMACEAE | | |
| <i>Syzygium eucalyptoides</i> | T | OF | <i>Celtis philippinensis</i> | T | VF |
| PANDANACEAE | | | VERBENACEAE | | |
| <i>Pandanus spiralis</i> | P | OF | <i>Avicennia marina</i> | T | MA |
| PASSIFLORACEAE | | | <i>Clerodendrum floribundum</i> | S | OF |
| <i>Passiflora foetida</i> * | V | MF | <i>Lantana camara</i> * | S | MF |
| | | | <i>Premna acuminata</i> | S | VF |
| PITTOSPORACEAE | | | <i>Premna serratifolia</i> | S | VF |
| <i>Pittosporum melanospermum</i> | S | OF | <i>Vitex acuminata</i> | T | VF |
| | | | <i>Vitex glabrata</i> | T | MF |
| PLUMBAGINACEAE | | | <i>Vitex trifolia</i> | S | VF |
| <i>Aegialiis annulata</i> | S | MA | VITACEAE | | |
| PROTEACEAE | | | <i>Ampelocissus acetosa</i> | V | MF |
| <i>Grevillea decurrens</i> | S | OF | <i>Cayratia</i> sp. | V | VF |
| <i>Persoonia falcata</i> | S | OF | | | |

TABLE 2. Summary of quadrat data for plants, in order of decreasing total relative abundance

| Species | Transect 2 | | | Transect 1 | | | TOTAL | | |
|------------------------------------|------------|------------|-------------|------------|------------|-------------|-------|------------|-------------|
| | Count | Av. Height | Rel. Abund. | Count | Av. Height | Rel. Abund. | Count | Av. Height | Rel. Abund. |
| <i>Terminalia ferdinandiana</i> | 34 | 3.12 | 16.35 | 57 | 2.56 | 9.94 | 91 | 2.84 | 24.66 |
| <i>Buchanania obovata</i> | 25 | 1.30 | 12.02 | 16 | 1.25 | 7.45 | 41 | 1.28 | 11.11 |
| <i>Acacia aulacocarpa</i> | 23 | 3.39 | 11.06 | 12 | 3.17 | 7.45 | 35 | 3.28 | 9.49 |
| <i>Planchonia careya</i> | 20 | 1.33 | 9.62 | 13 | 1.23 | 4.35 | 33 | 1.28 | 8.94 |
| <i>Eucalyptus tetradonta</i> | 15 | 3.07 | 7.21 | 12 | 3.08 | 4.35 | 27 | 3.08 | 7.32 |
| <i>Pogonolobus reticulatus</i> | 15 | 1.30 | 7.21 | 7 | 1.07 | 1.24 | 22 | 1.19 | 5.96 |
| <i>Ficus opposita</i> | 7 | 2.14 | 3.37 | 2 | 1.75 | 0.62 | 9 | 1.95 | 2.44 |
| <i>Glochidion xerocarpum</i> | 7 | 1.14 | 3.37 | 2 | 1.00 | 0.62 | 9 | 1.07 | 2.44 |
| <i>Cycas armstrongii</i> | 8 | 1.00 | 3.85 | 1 | 1.00 | 1.86 | 9 | 1.00 | 2.44 |
| <i>Eucalyptus clavigera</i> | 6 | 4.50 | 2.88 | 3 | 0.62 | 0.62 | 9 | 4.25 | 2.44 |
| <i>Lophostemon lactifluus</i> | 1 | 3.00 | 0.48 | 7 | 4.00 | 0.62 | 8 | 3.50 | 2.17 |
| <i>Pandanus spiralis</i> | 7 | 2.29 | 3.37 | 1 | 3.00 | 0.00 | 8 | 2.65 | 2.17 |
| <i>Syzygium eucalyptoides</i> | 1 | 4.00 | 0.48 | 6 | 1.50 | 0.00 | 7 | 2.75 | 1.90 |
| <i>Eucalyptus miniata</i> | 5 | 5.00 | 2.40 | 0 | 0 | 0.00 | 5 | 5.00 | 1.36 |
| <i>Antidesma ghaesembilla</i> | 2 | 1.25 | 0.96 | 3 | 1.00 | 0.00 | 5 | 1.13 | 1.36 |
| <i>Carallia brachiata</i> | 5 | 1.50 | 2.40 | 0 | 0 | 0.00 | 5 | 1.50 | 1.36 |
| <i>Sterculia quadrifida</i> | 5 | 1.80 | 2.40 | 0 | 0 | 0.00 | 5 | 1.80 | 1.36 |
| <i>Calytrix exstipulata</i> | 0 | 0 | 0 | 4 | 2.00 | 0.00 | 4 | 2.00 | 1.08 |
| <i>Petalostigma quadriloculare</i> | 4 | 1.00 | 1.92 | 0 | 0 | 0.00 | 4 | 1.00 | 1.08 |
| <i>Acacia umbellata</i> * | 0 | 0 | 0 | 3 | 1.00 | 1.24 | 3 | 1.00 | 0.81 |
| <i>Alstonia actinophylla</i> | 1 | 3.00 | 0.48 | 2 | 3.00 | 0.00 | 3 | 3.00 | 0.81 |
| <i>Canarium australianum</i> | 3 | 1.83 | 1.44 | 0 | 0 | 0.00 | 3 | 1.83 | 0.81 |
| <i>Brachychiton megaphylla</i> | 3 | 1.33 | 1.44 | 0 | 0 | 0.00 | 3 | 1.33 | 0.81 |
| <i>Capparis unbonata</i> | 3 | 1.00 | 1.44 | 0 | 0 | 0.00 | 3 | 1.00 | 0.81 |
| <i>Grewia retusifolia</i> | 2 | 1.00 | 0.96 | 0 | 0 | 0.00 | 2 | 1.00 | 0.54 |
| <i>Bridelia tomentosa</i> | 0 | 0 | 0 | 2 | 1.00 | 0.00 | 2 | 1.00 | 0.54 |
| <i>Gardenia megasperma</i> | 2 | 1.00 | 0.96 | 0 | 0 | 0.00 | 2 | 1.00 | 0.54 |
| <i>Cochlospermum fraseri</i> | 1 | 3.00 | 0.48 | 1 | 3.00 | 0.00 | 2 | 3.00 | 0.54 |
| <i>Ixora klunderana</i> | 2 | 1.25 | 0.96 | 0 | 0 | 0.00 | 2 | 1.25 | 0.54 |
| <i>Grevillea decurrens</i> | 0 | 0 | 0 | 2 | 1.75 | 0.62 | 2 | 1.75 | 0.54 |
| <i>Acacia dimidiata</i> | 1 | 1.00 | 0.48 | 1 | 1.00 | 0.62 | 2 | 1.00 | 0.54 |
| <i>Eucalyptus porrecta</i> | 0 | 0 | 0 | 1 | 1.50 | 0.62 | 1 | 1.50 | 0.27 |
| <i>Melaleuca viridiflora</i> | 0 | 0 | 0 | 1 | 2.00 | 0.62 | 1 | 2.00 | 0.27 |
| <i>Livistonia humilis</i> | 0 | 0 | 0 | 1 | 1.50 | 0.62 | 1 | 1.50 | 0.27 |
| <i>Vitex acuminata</i> | 0 | 0 | 0 | 1 | 2.50 | 1.55 | 1 | 2.50 | 0.27 |
| TOTAL | 208 | | 100 | 161 | | 45 | 369 | | 100 |

TABLE 3. Herpetofauna and mammals recorded on the campus

*, introduced species; ?, identification based solely on calls (confirmation desirable);
(), number of specimens trapped (and released) in brackets

Amphibians

| | |
|-------------------------------------|------------------|
| <i>Litoria caerulea</i> | Green Tree Frog |
| <i>Litoria rubella</i> (1) | Desert Tree Frog |
| <i>Litoria microbelos</i> (1) | |
| <i>Limnodynastes convexiusculus</i> | Marbled Frog |
| <i>Uperoleia inundata</i> ? | |

Reptiles

| | |
|---------------------------------------|------------------------------|
| <i>Heteronotia binoei</i> | Bynoe's Gecko (7) |
| <i>Hemidactylus frenatus</i> * | Asian House Gecko |
| <i>Carlia amax</i> | Two-spined Rainbow Skink (1) |
| <i>Carlia rufilatus</i> | Red-sided Rainbow Skink (3) |
| <i>Cryptoblepharus plagiocephalus</i> | Arboreal Snake-eyed Skink |
| <i>Sphenomorphus darwiniensis</i> | Darwin Skink (2) |
| <i>Gemmatophora temporalis</i> | Northern Dragon (1) |
| <i>Diporiphora bilineata</i> | Two-lined Dragon |
| <i>Chlamydosaurus kingii</i> | Friiled Dragon |
| <i>Varanus timorensis scalaris</i> | Spotted Tree Monitor (1) |

Mammals

| | |
|---------------------------------|------------------------------|
| <i>Isodon macrourus</i> | Northern Brown Bandicoot (1) |
| <i>Trichosaurus arnhemensis</i> | Northern Brushtail Possum |
| <i>Macropus agilis</i> | Agile Wallaby |
| <i>Pteropus alecto</i> | Black Flying-fox |
| <i>Miniopterus schreibersii</i> | Common Bent-wing |
| <i>Myotis adversus</i> | Large-footed Mouse-eared Bat |
| <i>Canis familiaris</i> | Dingo |
| <i>Felis catus</i> * | Domestic Cat |

TABLE 4. List of birds of Casuarina campus and immediate environs

**, breeding (incomplete data); # species recorded only once; bold type, species recorded within the study site. Includes Alawa ovals and mangroves adjacent to stormwater channels. (all data: R. Noske, pers. obs.)

| | |
|---|---------------------------------------|
| White-faced Heron | Spotted Nightjar # |
| Striated Heron | Fork-tailed Swift |
| Great Egret | Azure Kingfisher |
| Little Egret | Forest Kingfisher |
| Straw-necked Ibis | Sacred Kingfisher |
| Sacred (White) Ibis | Rainbow Bee-eater |
| Black-necked Stork (Jabiru) | Dollar Bird |
| Radjah Shelduck | Tree Martin |
| Osprey | Black-faced Cuckoo-shrike |
| Pacific Baza (Crested Hawk) | White-bellied Cuckoo-shrike ** |
| Black Kite | Varied Triller |
| Brahminy Kite | White-winged Triller |
| Whistling Kite | Lemon-bellied Flycatcher ** |
| Brown Goshawk | Grey Whistler |
| Grey Goshawk # | Shining Flycatcher |
| White-bellied Sea-eagle | Northern Fantail |
| Spotted Harrier # | Tawny Grassbird |
| Australian Hobby | Golden-headed Cisticola |
| Australian (Nankeen) Kestrel | Weebill ** |
| Orange-footed Scrub Fowl | Red-backed Fairy-wren |
| Brown Quail | Large-billed Gerygone |
| Bush Thick-knee ** | Mangrove Gerygone |
| Whimbrel | Green-backed Gerygone ** |
| Little Curlew | Silver-crowned Friarbird |
| Masked Lapwing | Helmeted Friarbird |
| Grey-tailed Tattler | Blue-faced Honeyeater |
| Common Sandpiper | White-gaped Honeyeater ** |
| Greenshank | White-throated Honeyeater ** |
| Silver Gull | Brown Honeyeater ** |
| Rose-crowned Fruit-dove # | Bar-breasted Honeyeater ** |
| Torresian Imperial (Torres Strait) Pigeon | Rufous-banded Honeyeater ** |
| Feral Pigeon | Dusky Honeyeater ** |
| Peaceful Dove ** | Red-headed Honeyeater |
| Bar-shouldered Dove | Banded Honeyeater # |
| Emerald Dove # | Mistletoe Bird |
| Red-tailed Black Cockatoo | Striated Pardalote |
| Galah | Yellow White-eye ** |
| Little Corella | Crimson Finch |
| Sulphur-crested Cockatoo ** | Double-barred Finch ** |
| Varied Lorikeet | Chestnut-breasted Finch |
| Red-collared Lorikeet | Yellow Oriole |
| Red-winged Parrot | Olive-backed Oriole |
| Oriental Cuckoo # | Figbird ** |
| Pallid Cuckoo # | Spangled Drongo |
| Horsfield's Bronze-cuckoo | Magpie-lark (Peewee) |
| Little Bronze-cuckoo ** | White-breasted Woodswallow |
| Common Koel | Black Butcherbird |
| Channel-billed Cuckoo # | Torresian Crow |
| Pheasant Coucal | |

TABLE 5. List of award units in which remnant vegetation is utilised

Course: Bachelor of Science (SBSC)

| | | |
|---------|-------------------------------|--|
| SBI 104 | Life on Earth Part B | collection of plant specimens |
| SBI 205 | Biology of Terrestrial Plants | collection of plant specimens and field identification |

Course: Assoc. Dip. of Applied Science (Env. Biology) (SADEB)

| | | |
|---------|------------------------------------|--|
| SBI 001 | Introduction to Field Techniques | demonstration of collecting and sampling techniques; data collection |
| SBI 003 | Biological Preservation Techniques | demonstration of plant collecting techniques |
| SBI 011 | Plant and Animal Physiology | collection of plants for laboratory experiments; in situ experiments |

Course: Assoc. Dip. of Applied Science (Trop. Horticulture) (SADTH)

| | | |
|---------|------------------------|----------------|
| TTH 715 | Horticultural Botany I | see Appendix 5 |
| TTH 718 | Tropical Plant Studies | see Appendix 5 |
| TTH 717 | Horticultural Botany 2 | see Appendix 5 |

Course: Cert. General Tech. Studies for Aborigines (CCGTS)

| | |
|---------|----------------------------------|
| GTC 103 | Introduction to Science |
| GTC 108 | Introduction to Biology |
| GTC 110 | Horticulture 1 |
| GTC 208 | Biology for Technical Assistants |
| GTC 210 | Horticulture 2 |

Course: Higher Ed. Prep. Program: Maths/ Science (CHEPMS)

| | |
|---------|---|
| MSP 105 | General Biology & Environmental Science 1 |
| MSP 205 | General Biology & Environmental Science 2 |

Appendix 1. List of plants according to life form

N.B. Trees, normally > 5m; campus specimens may not have reached this status

| | | |
|---------------------------------|------------------------------------|-------------------------------------|
| Cycad | <i>Gardenia megasperma</i> | <i>Hibiscus tiliaceus</i> |
| <i>Cycas armstrongii</i> | <i>Glochidion xerocarpum</i> | <i>Leucaena leucocephala</i> * |
| | <i>Grevillea decurrens</i> | <i>Litsea glutinosa</i> |
| Fern | <i>Helicteres isora</i> | <i>Lophostemon lactifluus</i> |
| <i>Acrostichum speciosum</i> | <i>Ixora klanderana</i> | <i>Lumnitzera racemosa</i> |
| | <i>Lantana camara</i> * | <i>Mallotus nesophila</i> |
| Herb | <i>Osbornia octodonta</i> | <i>Melaleuca cajuputi</i> |
| <i>Borreria</i> sp. | <i>Persoonia falcata</i> | <i>Melaleuca viridiflora</i> |
| <i>Gomphrena canescens</i> | <i>Petalostigma quadriloculare</i> | <i>Miliusa brahei</i> |
| <i>Grewia reusifolia</i> | <i>Pittosporum melanospermum</i> | <i>Peltophorum pierocarpum</i> |
| <i>Haemodorum coccineum</i> | <i>Pogonolobus reticulatus</i> | <i>Planchonella pohlmanniana</i> |
| <i>Sida cordifolia</i> * | <i>Premna acuminata</i> | <i>Planchonia careya</i> |
| <i>Tacca leontopetaloides</i> | <i>Premna serratifolia</i> | <i>Pongamia pinnata</i> |
| | <i>Scyphiphora hydrophyllacea</i> | <i>Rhizophora stylosa</i> |
| Lily | <i>Tabernaemontana pendacaulis</i> | <i>Sonneratia alba</i> |
| <i>Crinum angustifolium</i> | <i>Vitex trifolia</i> | <i>Sterculia quadrifida</i> |
| <i>Protoasparagus racemosus</i> | <i>Wrightia pubescens</i> | <i>Strychnos lucida</i> |
| | | <i>Syzygium eucalyptoides</i> |
| Mistletoe | Tree | <i>Terminalia ferdinandiana</i> |
| <i>Decasynina</i> sp. | <i>Acacia aulacocarpa</i> | <i>Thespesia populneoidea</i> |
| | <i>Acacia auriculiformis</i> | <i>Timonias timon</i> |
| Palm | <i>Acacia late-scens</i> | <i>Vitex acuminata</i> |
| <i>Livistona humilis</i> | <i>Alstonia actinophylla</i> | <i>Vitex glabrata</i> |
| <i>Pandanus spiralis</i> | <i>Ampelocissus acetosa</i> | <i>Xylocarpus mekongensis</i> |
| | <i>Antiaris toxicaria</i> | |
| Shrub | <i>Avicennia marina</i> | Vines |
| <i>Acacia dimidiata</i> | <i>Bombax ceiba</i> | <i>Cayratia</i> sp. |
| <i>Acacia holosericea</i> | <i>Brachychiton diversifolia</i> | <i>Flagellaria indica</i> |
| <i>Acacia oncinocarpa</i> | <i>Bruguiera exaristata</i> | <i>Flemingia</i> sp. |
| <i>Acacia umbellata</i> * | <i>Bruguiera parviflora</i> | <i>Gymnanthera nitida</i> |
| <i>Acanthus ilicifolius</i> | <i>Buchanania arborescens</i> | <i>Ipomoea pes-caprae</i> |
| <i>Aegialitis annulata</i> | <i>Buchanania obovata</i> | <i>Ipomoea quamoclit</i> * |
| <i>Aegiceras corniculatus</i> | <i>Canarium australium</i> | <i>Macroptilium atropurpureum</i> * |
| <i>Allophylus cobbe</i> | <i>Capparis sepiaria</i> | <i>Pachygone ovata</i> |
| <i>Antidesma ghaesembila</i> | <i>Carallia brachiata</i> | <i>Passiflora foetida</i> * |
| <i>Atalaya variifolia</i> | <i>Cathormium umbellatum</i> | <i>Phyllanthus ciccoides</i> |
| <i>Brachychiton megaphylla</i> | <i>Celtis philippinensis</i> | <i>Smilax australis</i> |
| <i>Breynia cernua</i> | <i>Ceriops tagal</i> | <i>Tinospora smilacina</i> |
| <i>Bridelia tomentosa</i> | <i>Cordia dichotoma</i> | |
| <i>Calytrix exstipulata</i> | <i>Cupaniopsis anacardioides</i> | |
| <i>Capparis umbonata</i> | <i>Erythrophleum chlorostachys</i> | |
| <i>Clerodendrum floribundum</i> | <i>Eucalyptus bleeseri</i> | |
| <i>Cochlospermum fraseri</i> | <i>Eucalyptus clavigera</i> | |
| <i>Diospyros calycantha</i> | <i>Eucalyptus miniata</i> | |
| <i>Dolichandrone filiformis</i> | <i>Eucalyptus papuana</i> | |
| <i>Exocarpos latifolius</i> | <i>Eucalyptus porrecta</i> | |
| <i>Ficus opposita</i> | <i>Eucalyptus tetradonta</i> | |
| <i>Ficus scobina</i> | <i>Excoecaria ovalis</i> | |
| <i>Flueggia virosa</i> | <i>Ficus hispida</i> | |

Appendix 2. List of plants according to habitat type

Mangroves

Acanthus ilicifolius
Acrostichum speciosum
Aegialitis annulata
Aegiceras corniculatus
Avicennia marina
Bruguiera exaristata
Bruguiera parviflora
Ceriops tagal
Excoecaria ovalis
Lumnitzera racemosa
Osbornia octodonta
Rhizophora stylosa
Scyphiphora hydrophyllacea
Sonneratia alba
Xylocarpus mekongensis

Mixed Forest

Alstonia actinophylla
Ampelocissus acetosa
Antidesma ghaesembila
Breynia cernua
Bridelia tomentosa
Canarium australianum
Cupaniopsis anacardioides
Diospyros calycanthera
Exocarpos latifolius
Flagellaria indica
Glochidion xerocarpum
Helicteres isora
Lantana camara *
Passiflora foetida *
Protoasparagus racemosus
Smilax australis
Sterculia quadrifida
Strychnos lucida
Tabernaemontana pendacaulis
Timonias timon
Tinospora smilacina
Vitex glabrata
Wrightia pubescens

Open forest

Acacia aulacocarpa
Acacia auriculiformis
Acacia dimidiata
Acacia holosericea
Acacia latescens
Acacia oncinocarpa
Acacia umbellata *
Atalaya varifolia
Borreria australiana
Brachychiton diversifolia
Brachychiton megaphylla
Buchanania obovata
Calytrix exstipulata
Capparis umbonata
Clerodendrum floribundum
Cochlospermum fraseri
Crinum angustifolium
Cycas armstrongii
Decasina sp.
Dolichandrone filiformis
Erythrophleum chlorostachys
Eucalyptus bleeseri
Eucalyptus clavigera
Eucalyptus miniata
Eucalyptus porrecta
Eucalyptus tetradonta
Ficus opposita
Flemingia sp.
Gardenia megasperma
Gomphrena canescens
Grevillea decurrens
Grewia retusifolia
Haemodorum coccineum
Livistona humilis
Lophostemon lactifluus
Melaleuca viridiflora
Pandanus spiralis
Persoonia falcata
Petalostigma quadriloculare
Pittosporum melanosperrum
Planchonella pohlmiana
Planchonia careya
Pogonolobus reticulatus

Sida cordifolia *

Syzygium eucalyptoides
Tacca leontopetaloides
Terminalia ferdinandiana

Riparian habitat

Eucalyptus papuana
Leucaena leucocephala *
Melaleuca cajuputi
Melaleuca leucodendra

Vine Forest

Allophylus cobbe
Antiaris toxicaria
Bombax ceiba
Buchanania arborescens
Cathormium umbellatum
Capparis sepiaria
Carallia brachiata
Cayratia sp.
Celtis philippinensis
Cordia dichotoma
Ficus hispida
Ficus scobina
Flueggia virosa
Gymnanthera nitida
Hibiscus tiliaceus
Ipomoea quamoclit *
Ixora klanderana
Litsea glutinosa
Macroptilium atropurpureum *
Mallotus nesophila
Miliusa brahei
Pachygone ovata
Peltophorum pterocarpum
Phyllanthus ciccoides
Pongamia pinnata
Premna acuminata
Premna serratifolia
Thespesia populneoides
Vitex acuminata
Vitex trifoliata
Ipomoea pes-caprae

Appendix 3. Taxonomic list of plant species found at Lee Point but not at NTU Casuarina Campus

| | | | | | |
|---|---|----|---|---|----|
| ACANTHACEAE <i>Andrographis paniculata</i> * | H | VF | NYCTAGINACEAE <i>Pisonia aculeata</i> | V | VF |
| ANNONACEAE <i>Cyathostemma micranthum</i> | V | VF | OLEACEAE <i>Jasminum</i> sp. | V | MF |
| APOCYNACEAE <i>Alyxia spicata</i> | V | MF | OPIACEAE <i>Opilia amentacea</i> | V | VF |
| <i>Ichnocarpus frutescens</i> | V | VF | PASSIFLORACEAE <i>Adenia heterophylla</i> | V | VF |
| CAESALPINIACEAE <i>Caesalpinna bonduc</i> | V | VF | PROTEACEAE <i>Stenocarpus cunninghamii</i> | S | OF |
| CELASTERACEAE <i>Denhamia obscura</i> | S | MF | RHAMNACEAE <i>Alphitonia excelsa</i> | T | VF |
| CHRYSOBALANACEAE <i>Maranthes corymbosa</i> | T | MF | <i>Ziziphus oenoplia</i> | V | VF |
| DIOSCOREACEAE <i>Dioscorea transversa</i> | V | MF | RUBIACEAE <i>Aidia racemosa</i> | T | VF |
| EBENACEAE <i>Diospyros compacta</i> | S | VF | <i>Canthium lucidum</i> | S | VF |
| ELAEOCARPACEAE <i>Elaeocarpus arnhemicus</i> | T | VF | <i>Pavetta brownii</i> | S | VF |
| EUPHORBIACEAE <i>Croton arnhemicus</i> | S | OF | RUTACEAE <i>Glycosmos pentaphylla</i> | S | VF |
| <i>Drypetes lasiogyne</i> | T | MF | <i>Micromelum minutum</i> | S | VF |
| FABACEAE <i>Abrus precatorius</i> | V | VF | <i>Zanthoxylum parviflorum</i> | T | VF |
| <i>Flemingia</i> sp. | V | OF | SAPOTACEAE <i>Mimusops elengi</i> | T | VF |
| FLACOURTIACEAE <i>Flacourtia territorialis</i> | S | VF | <i>Pouteria sericia</i> | S | MF |
| LAMIACEAE <i>Hyptis suaveolens</i> * | H | OF | ULMACEAE <i>Trema aspera</i> | S | VF |
| LAURACEAE <i>Cassytha filliformis</i> | V | MF | VITACEAE <i>Cissus</i> sp. | V | VF |
| <i>Cryptocarya cunninghamii</i> | T | VF | ZINGIBERACEAE <i>Curcuma australasica</i> | H | VF |
| MELASTOMACEAE <i>Memecylon pauciflorum</i> | S | VF | | | |
| MELIACEAE <i>Dysoxylum oppositifolium</i> | T | VF | | | |
| MIMOSACEAE <i>Acacia difficilis</i> | S | OF | | | |
| MORACEAE <i>Malaisia scandens</i> | V | VF | | | |
| MYRTACEAE <i>Melaleuca leucadendron</i> | T | R | | | |

NORTHERN TERRITORY UNIVERSITY
ITAFE
DEPARTMENT OF HORTICULTURE

MEMORANDUM

TO Richard Noske
FROM Joan Dillon
SUBJECT Department use of campus vegetation
DATE 3 February 1993

The vegetation on campus is used quite extensively by this department in a number of ways:

1. Specimens of the the cultivated and indigenous trees, shrubs and ground covers are collected for use in laboratory practicals for the two Certificate/Associate Diploma subjects Horticultural Botany 1 and Tropical Plant Studies. Some of these plants are not readily obtained off campus because of the surrounding urban development.
2. Both groups of plants are studied in situ by the Tropical Plant Studies students.
3. Students studying plant ecology as part of Horticultural Botany 2 are made aware of the development of the major plant communities in the Northern Territory but have not to date directly studied the vegetation on campus.
4. Students in the present Trade Certificate course study the communities of plants in the unit Plant Ecology. The existing communities are a valuable resource as they clearly show how different groups of plants are suited to differing soil types and drainage patterns.
5. The proposed new Trade Certificate will offer a module Australian Natives which will draw extensively on the campus resource of native vegetation.
6. The natural plant communities are examined by the non award course Permaculture students as part of their studies.
7. Practical plant identification is carried out in the campus bushland by the Certificate in General Studies students (CAIS).


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